

ABSTRACT

A near field optical apparatus comprising a conductive sheet or plane
5 having an aperture therein, with the conductive plane including at least one
protrusion which extends into the aperture. The location, structure and
configuration of the protrusion or protrusions can be controlled to provide desired
near field localization of optical power output associated with the aperture.
Preferably, the location, structure and configuration of the protrusion are tailored
10 to maximize near field localization at generally the center of the aperture. The
aperture preferably has a perimeter dimension which is substantially resonant with
the output wavelength of the light source, or is otherwise able to support a
standing wave of significant amplitude. The apparatus may be embodied in a
vertical cavity surface emitting layer or VCSEL having enhanced nearfield
15 brightness by providing a conductive layer on the laser emission facet, with a
protrusion of the conductive layer extending into an aperture in the emission facet.
The aperture in the emission facet preferably has dimensions smaller than the
guide mode of the laser, and the aperture preferably defines different regions of
reflectivity under the emission facet. The depth of the aperture can be etched to
20 provide a particular target loss, and results in higher optical power extraction from
the emission facet.